

## CLAIMS

What is claimed is:

1. A method for increasing cellular system capacity, comprising the steps of:  
receiving a signal in a time slot in a frequency band;  
transmitting a signal in the same time slot and the same frequency band; and  
using an adaptive self-interference canceller to reduce the radio frequency self-interference created by receiving and transmitting signals in the same time slot.
2. The method according to claim 1, further comprising the step of using a circulator, the circulator being connected between an antenna, a receiver, and a transmitter, whereby the circulator acts to reduce radio frequency self-interference by isolating the signal flow between the antenna and the receiver or between the transmitter and the antenna.
3. The method according to claim 1, further comprising the step of using separate antennas for receiving and transmitting.
4. The method according to claim 1, further comprising the step of using an adaptive antenna.
5. A system for increasing cellular system capacity, comprising:  
an antenna;  
a receiver section connected to said antenna, said receiver section receiving a signal;  
a transmitter section connected to said antenna, said transmitter section transmitting a signal; and  
an adaptive self-interference canceller connected between said receiver section and said transmitter section, said adaptive self-interference canceller reducing radio frequency self-interference created when said receiver section receives a signal and said

transmitter section transmits a signal in the same time slot and the same frequency band.

6. The system according to claim 5, further comprising a circulator connected between said antenna, said receiver section, and said transmitter section.

7. The system according to claim 5, wherein said antenna comprises an adaptive antenna.

8. The system according to claim 5, wherein said antenna comprises a single antenna for receiving and transmitting signals.

9. The system according to claim 5, wherein said antenna comprises an antenna array for receiving and transmitting signals.

10. The system according to claim 5, wherein said antenna comprises a first antenna for receiving signals and a second antenna for transmitting signals.

11. The system according to claim 5, wherein said antenna comprises a first antenna array for receiving signals and a second antenna array for transmitting signals.

12. A method for increasing the uplink and downlink capacity in a wireless system, comprising the step of using a single time slot and frequency band for both the uplink and downlink transmissions.

13. The method according to claim 12, further comprising the step of using an adaptive self-interference canceller, whereby the canceller acts to reduce baseband self-interference.

14. The method according to claim 13, further comprising the step of using a circulator.

15. The method according to claim 14, further comprising the step of using an adaptive antenna, whereby the adaptive antenna acts to reduce self-interference.

16. The method according to claim 12, further comprising the step of using an adaptive self-interference canceller, whereby the canceller acts to reduce baseband self-interference by subtracting the self-interference from the rest of a received signal.

17. The method according to claim 16, further comprising the step of using a circulator, the circulator being connected at the junction of a transmitter output, an antenna, and a receiver input, whereby the circulator reduces radio frequency self-interference.

18. A method for increasing the uplink and downlink capacity in a wireless system, comprising the step of using an adaptive antenna in a base station for a single cell, whereby a mobile unit operating in that cell can use a single time slot while a mobile unit in a neighboring cell can also use the same time slot.

19. A method for increasing the uplink and downlink capacity in a wireless system, comprising the step of using an adaptive antenna in a first mobile unit, whereby the adaptive antenna acts to reduce interference with a second mobile unit such that the first mobile unit can receive a signal in a time slot while the second mobile unit is transmitting a signal in the same time slot.

20. The method according to claim 19, further comprising the step of using an adaptive antenna at a first base station that communicates with the first mobile unit,

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whereby the interference between the first base station and neighboring base stations is reduced so that the same time slot can be more easily used in neighboring base stations.